

The Heterodyne

Newsletter of the West Valley Amateur Radio Association

November Meeting

Annual WVARA Elections

Wednesday, November 14
Meeting Starts at 7pm

Meeting Location:
American Red Cross,
Silicon Valley Chapter
2731 N. First Street at Plumeria Dr
(southwest corner) in San Jose

WVARA Repeaters (W6PIY)		
Band	Frequency	PL
6 Meters	52.580- MHz	151.4 Hz
2 Meters	147.39+ MHz	151.4 Hz
1.25 Meters	223.96- MHz	156.7 Hz
0.70 Meter	441.35+ MHz	88.5 Hz
0.23 Meter	1286.2- MHz	100 Hz

Club Net

WVARA's club net is on the W6PIY repeaters each Tuesday at 8:30 pm. All repeaters are linked together during the net. The net script can be found at www.wvara.org/net.html.

Visitors Are Welcome!

President's Letter

Once again, we head to the polls – only this time it has nothing to do with national politics – or really any politics at all. It is time to elect some new WVARA officers. I strongly suggest each of you become an officer or board member at some point of your tenure in this fantastic club we have. To help you with this evaluation, I'd like to list the elected posts and what it takes to make each one successful. The exact tasks move around a little, but this is a pretty good place to start.

President: For this, you need to be able to keep a group moving, whether at a club meeting or a board meeting. We all need a little guidance or we'll end up sitting around laughing and telling radio stories for hours. This post is all about that guidance. The time requirement is not huge. In addition to the regular club meetings, there are 2-3 board meetings per year of about the same duration. This is a one year term, two years max. Each month you get to wax poetically about some topic for The Het, which is a great way to spread ideas – whether in a form such as this post or any others (hint, hint everyone).

Vice President: For this post, the key task is to find speakers for each meeting. That can be a bit time consuming, but I think we should broaden the team involved with finding good guests to more than just this one person. If you have lots of interesting connections that would want to talk to the group, the time involved might not be too much. This is a one year term.



Treasurer: You need to go through the club mail, collect dues, and keep our finances straight. This takes a few hours each month, but can be done whenever you want during the month. This is a one year term.

Secretary: This is all about keeping track of what goes on in the board meetings, issuing minutes, and working with the treasurer to keep our registrations up to date. This is a one year term.

Board Member: The Board of Directors is comprised of six people, three of which get voted on each year, so it is a two year term. We hold at least two board meetings each year, where all elected officials attend. What activities should we do? Will we change or fix some part of the repeater? Who is lined up for the flea market, Field Day leader, picnic, etc? What other neat things should we do? This is a great way to have a voice in the club's direction without taking up much additional time at all.

I hope each of you will consider running for one of these posts. Our group is as dynamic as it is because of the energy we all put forth. Put some of that energy into one of these roles; you'll have a great time doing it.

See you at the November meeting! Bobby K0XI

WVARA Net Check-Ins (W6PIY, Tuesdays at 8:30 PM)						
Call Sign	Name	10/09/18	10/16/18	10/23/18	10/30/18	11/06/18
Total		17	12	13	9	10
AA6RB	Roy		X	X		
AE6JV	Bill	X				X
AF6AE	Bill	X	X			
AG6YO	Kevin	X				
AI6EH	John		X			
AI6NT	Henry	X				
K6QFO	Mike			X	X	
KC6ZKT	Steve					X
KE6MT	Rex	X				
KF6EMB	Svend		X	X	X	X
KG6KXD	Jason	X				
KI6SLX	Peri	X				X
KJ6MPZ	Paul		X			
KJ6ZZI	Michael	X	X			
KK6HWN	Paul			X		
KK6VF	Kevin	NET	NET	NET	NET	
KM6FDD	Lloyd			X		
KM6GVO	Erik	X				
N6BTU	Wayne		X		X	X
N6FYR	Matt	X		X		X
N9CU	Andy	X		X	X	X
W3RRC	Milt			X		
W6BG	Max					X
W6ESL	Tom	X	X	X		
W6IA	Mark	X	X	X	X	NET
W6PK	Phil	X			X	
WB6KHP	Dave	X	X	X	X	X
WR3K	Greg	X				
WR6Z	Dave		X	X	X	

Ham Radio On a Budget: QRP Labs, QRPGuys, CW Academy

Part 2 by Rex Vokey, KE6MT

(See the September 2018 Heterodyne for Part 1)

Get Going

Here's what I think a great entry into HF would be, for a ham on a budget. The key major components would be:

- QRP Labs QCX single-band transceiver kit – 40 meters version
- QRPGuys Portable No Tune End Fed Half Wave Antenna
- QRPGuys Iambic Mini Paddle with Base
- CWops' CW Academy

QRP Labs has designed an impossibly low-cost, high performance transceiver with the QCX. Hans Summers, G0UPL, is doing a great service to the amateur radio community by designing such a kit.

And then there's QRPGuys. I don't know how they offer their kits at such low prices, but you'd be hard-pressed to source the parts yourself for a lower cost. They have nicely-designed kits at almost-impossible costs. The only time their stuff gets slightly pricier is if you live outside the US. The shipping costs go up quite a bit. I'm guessing there are probably creative ways around that, but even if you factor it in, their kits are still very low cost.

You'll need some stuff to support this setup, such as power and various connectors/adapters. I'm going to leave it up to you, how you want to do it, but here's what I have:

- **1500 mAh LiPo battery**, with Anderson Powerpole connectors added by me, and some kind of LiPo charger. I got these things from HobbyKing.
- **BNC Barrel Connector** (male-male)- connect end-fed antenna matching unit directly without coax
- **QRPGuys Tuning Indicator** – indicates SWR and protects rig when in “tune” mode
- **Antenna wire** - you supply the wire for making the end-fed antenna. Almost any wire will do, but 20 - 24 awg is best. I like getting my wire from SOTABeams.

All of this should come in around \$100-150USD. If you simply don't want to do Morse code, there's the option of the BITX40, a very inexpensive HF SSB rig that runs on 40 meters. But in my opinion, if you can invest the time to learn Morse code, it is a much more fulfilling and rewarding experience.

QRP Labs QCX

This amazing little rig was the catalyst for this post. Ever since it was released last year, I've had my eye on it. I didn't strictly **need** to buy it. I already had my Yaesu FT-817ND, and my trusty little Mountain Topper MTR-3B. But I like building kits, and really believed it would be fulfilling, operating a rig I had personally built. I was right. I also wanted to be able to prove that a new (or old) ham could get into HF operation for around \$100 all-in.

A few weeks ago I ordered the kit. It showed up surprisingly fast. It was in my hands a week

later. Apparently, they keep some units stocked in the US now. I couldn't resist the urge to dive right into the build, so I got it done over 3-4 days.



About 30% Into the QCX Build

Some Electronics Experience Helpful

Now, I will pause here and say that the QCX build is a little bit involved, and it would be helpful to have some soldering experience, and perhaps to have put together some other, simpler kits. I've done a decent amount of soldering and assembled maybe a dozen electronics kits, but I'm nowhere near what I would call an expert.

Which Band

I won't go into extreme detail here, but I chose, and would recommend, 40 meters. At least where I am, it's a band that's usable almost any time of day and has a good deal of use by other hams.

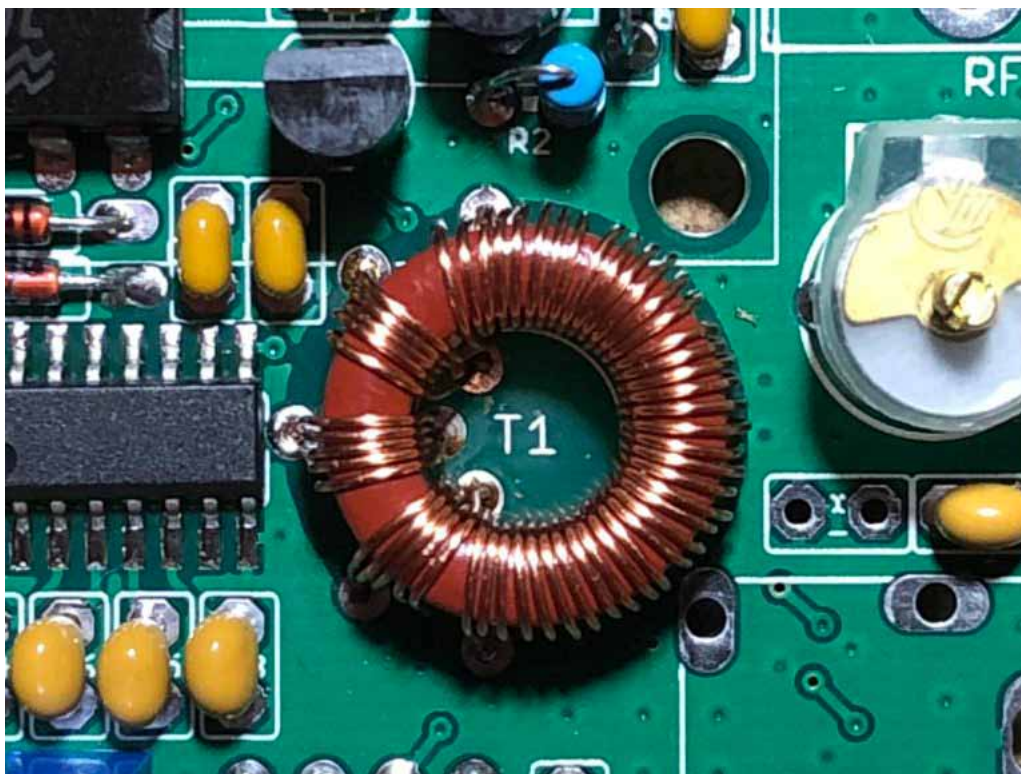
Thorough Instructions

I've never encountered more detailed, thorough, helpful instructions with *anything* I've ever built. The documentation for the QRP Labs QCX is simply the best I've encountered. It really walks you through every step. And if you happen to get hung up at all, there are several people who have created YouTube videos of their builds.

Toroids

I've heard rumors of people thinking toroids are difficult to wind. I honestly haven't ever heard it directly. I admit, however, that the first time I ever had to wind one, I was apprehensive. This kit wasn't my first time winding them, so I didn't have any of that apprehension this time

around. In fact, I was kind of looking forward to it. All of them were easy except one: the receiver input transformer—"T1."



T1. I'm Just Going to Go Ahead and Call It "Terminator"

This has four separate windings on it, accomplished by winding them all at once and leaving loops at certain points which are then cut to form the separate windings. Depending on the band the radio is being built for, this transformer can have up to 83(!) turns. In my case, it was an "easy" 53 turns total. Still, there's not a whole lot of room to work with. The winding itself was easy. The trouble I had came when I cut it into the separate windings and attempted to put all of the wires in the right place. The windings started crossing over each other, making things not only look unkempt, but actually making it hard to tell if the leads were going to the appropriate places. With a lot of patience, I eventually sorted this out. It didn't take any special skills—just patience.

Final Assembly

Mostly, you're just soldering the right parts in where you're shown they should go. After getting the toroids wound and installed, there are a few more parts and you're done! The kit is set up so you have the option of mounting the knobs and other connective hardware off the main board (on your case). I opted to mount them on the board.

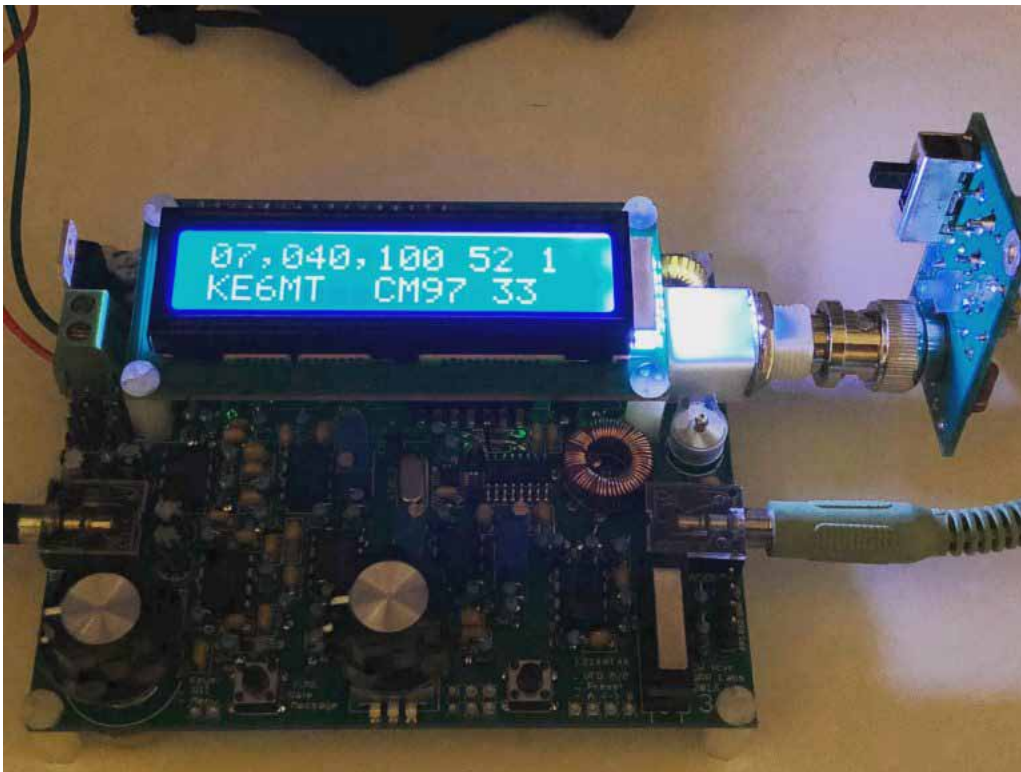
Unlike some kits, rather than assembling and testing things in stages, it's recommended to just assemble the whole thing, then test. After I got everything together, I plugged it in to see if there was any smoke. No smoke!

Adjustment and Alignment

The QCX has its own test equipment built in! There are some simple adjustments to be made after assembly and you're good to go. It took me about 20 minutes to get this done.

Testing the QCX

I ran the rig connected to a QRP dummy load I have, and keyed down to measure the approximate power output. It put out approximately 2.5-3 watts with around 12 volts in. According to the graphs in the manual, it would put out about 4.5 watts at a full 13.8 volts. I ran it on WSPR (yes, it can act as a WSPR beacon!) all night and it performed well. The next day, I tested it out on CW. It passed with flying colors.



QRP Labs QCX Running WSPR

The QCX is a Great Kit

So, there it is. I believe the QCX (which stands for QRP-Labs CW Transceiver, by the way) is an excellent way to jump into HF. It's frequency-agile within the chosen band, so you can tune around and make contacts. It has a great filter and nicely sensitive receiver. All the good bits are there. It even has a CW decoder, though I recommend not relying on it (or any decoder)—humans are better at it, and you'll want to learn!

Here is a link to a great YouTube video:

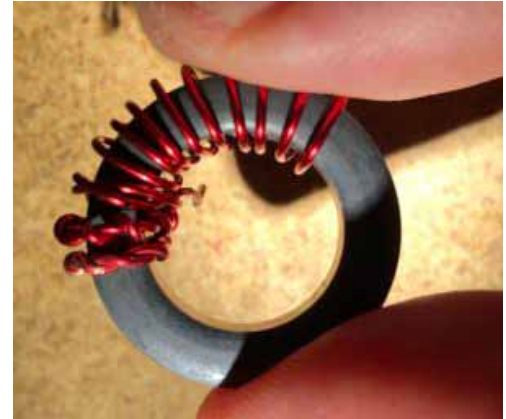
https://youtu.be/6zICuPq2aNA?list=PL0s2rXsGjPDoLwz4XowsbF8n8bWdv0J_r

OK, on to the antenna!

QRPGuys No-Tune End-Fed Half-Wave Antenna

What better than a super-simple antenna to match a super-simple rig? There are *lots* of options here. You can build your own dipole – it's one of the most simple antennas you could build. But then you need a way to get the whole thing up in the air, you need coax to run to the center of it, etc. There are complications and trade-offs with every antenna. What I've chosen for this setup, though, is an end-fed half-wave antenna. Even within end-fed antennas, there are *lots* of ways you can do things. In this case, however, we have a 64:1 impedance transformer and capacitor on a circuit board shaped to allow winding the antenna wire right on it. This particular kit was given to me for testing by Doug Hendricks, KI6DS of QRPGuys, but I've built and regularly use other EFHW antennas.

There's very little soldering to do on this kit. Probably the hardest part is winding the toroid, and that isn't even very difficult. Since the toroid and its windings compose an autotransformer—a transformer in which there is one winding, a portion of which is common to both the primary and secondary circuits. It's a lower-loss way of transforming the super-high impedance of an end-fed half-wave wire, which can be around 2.5 - 4.5k ohms, depending on the design, length of wire and surrounding terrain. The first three windings of this transformer consist of the wire wound back on itself and twisted, so that we have 3 primary windings and 24 secondary windings. This is a ratio of 8:1, which gives us an impedance ratio of 64:1, taking that 2.5 - 4.5k ohms down near where we want it, 50 ohms. The closest number being roughly 3.25k ohms. You're not going to be measuring any of this—I'm just explaining a (perhaps overly) simplified version of the theory.



Halfway Through Winding

After getting the board all together, you measure wire for the desired band (it has recommended lengths in the instructions and right on the board). I used to just use a yardstick or 2-foot level, counting off lengths of wire until I got to the right number. I'd even add little bit each time. For this one, I pulled my measuring tape out to 20 feet, pinned the wire under a weight, and measured out 3 lengths of that, then another 5 feet or so. The recommended length was actually 61' 6" for a 40m antenna, but I always add some, plus I'd somehow lost the capacitor that comes with the kit and had replaced it with a lower-value capacitor I had around (but still rated for high voltage). My hunch was that the lower-value capacitor might increase the needed length of wire for my antenna. I'm not sure if that was true, but in this case, I put the antenna up in the back yard in inverted-V configuration, and the SWR was pretty good (<1.5:1) across the entire 40m band. Not being one to mess with a good thing, I did no trimming. Good to go!

QRPGuys Iambic Mini Paddle with Base

This was my first CW paddle. It wasn't the first one I used (that was a borrowed Bencher paddle – good stuff!) but it was the first one I bought, so that I could start practicing sending of Morse code. Sure, I could practice with a straight key, but since I knew I'd mostly be using a paddle for day-to-day (and SOTA) use, I went with a paddle. With a "keyer" circuit, either built into the radio (most modern radios have this, including the QCX), or a separate keyer, the

paddle sends a continuous stream of “dits” on one side, and “dahs” on the other. If you want to know more about dual-level paddles (and iambic keying), check out this section on Wikipedia.

This paddle is one of the least expensive options out there for a dual-lever paddle. And the assembly consist mostly of soldering circuit boards together. It's quite an ingenious design concept. The paddles are made of thin stainless steel mounted to come into contact with a center post holding a washer. A very simple, fool-proof design.



Here Are the Parts

There are some tricky aspects to this, like getting the tiny nuts onto tiny screws. But overall, it's a pretty simple assembly process. Just make sure you take the time to align everything correctly! The instructions are very helpful, and all but guarantee success.



QRPGuys Iambic Paddle Assembled

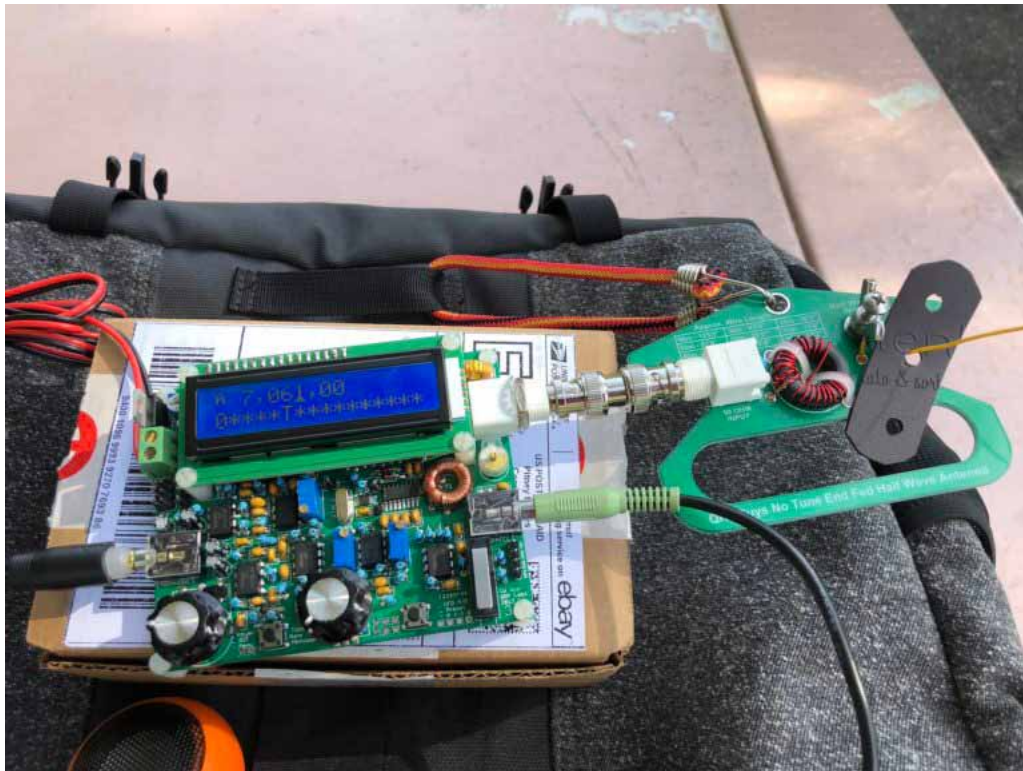
After using the paddle a bit, I decided I wanted tighter spacing. One way to accomplish this is simply to bend the paddles a bit. They tend to spring back, so I couldn't bend them enough without removing them. I opted to find a bigger washer. After visiting a couple of different hardware stores, I found a washer that had a bigger outside diameter, while still having a small enough inside diameter. It was just slightly too big, so I filed down the sides a little bit. Now it's perfect!

Learning Morse Code—CW Academy

I'm not going to go super in-depth on CW Academy. I've covered it in more depth in other posts on my blog, as well as a little bit in this post. There are lots of different ways to learn Morse code, but I think the most important and common thread to all who've had success with it, is to dedicatedly put in the time to learn it. You must do lots of sending and even more listening. Mostly listening. Like, *way more* listening than sending. There are lots of good tools out there, and I've used them with some success, but with a busy life and lots of priorities, it's hard to put in the time to really get moving on CW/Morse code. CW Academy provides the path and (more importantly for me) the accountability to make progress. It's free, and with Level 1, you'll learn enough to get on the air with your new QRP Labs QCX and QRPGuys antenna.

Summary

There are *lots* of ways to do any given activity in amateur radio. I'm presenting *one* way to do *one thing* in amateur radio—get on the air on the 40-meter band. It's a big thing! But any ham with a soldering iron and some patience can do this. Whether you're a Technician-class just starting out, or you tested all the way to Extra-class right out of the gate and you've been trying to figure out what to do with it, here's something almost any ham can do.



QCX and EFHW Antenna In Action

November 14 Meeting - Elections and More

Hello Everyone,

We have a meeting this Wednesday (11/14) at the Red Cross at 19:00 in Meeting Room 5 at the Silicon Valley Chapter of the American Red Cross, 2731 N. First Street at Plumeria Drive (southwest corner) in San Jose. Talk in is available on the association repeaters, 2m is a good choice.

Most of us come in through the side entrance on the southwest side of the building. Look for our red WVARA sign on the side where they park all the Red Cross trucks. Visitors are welcome!

I'm still putting together some final details for our program, but at a minimum, it's time to elect officers and the board of directors for WVARA!

Due to substantially increased obligations at work and no end in sight, I have regretfully decided that it would be best for the club if I not run for re-election as VP this year. Don't worry, I'm not going anywhere, and I'll even throw my hat into the ring for the board of directors, but I would like to thank everyone for all of the support this last year. This is a really great group. Bobby has our candidates and ballots ready to go!

Pre-meeting dinner: A few of us usually meet for dinner somewhere near the Red Cross around 6 pm prior to the meeting and anyone is welcome to join. This month we're going to go back to Dish'n'Dash just a block down the street: <https://www.yelp.com/biz/dish-n-dash-san-jose>

Hope to see you at the meeting!
73, Bill/W9KKN

2018 West Valley Amateur Radio Association Board

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